UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

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BRANCH OF RESEARCH

March, 1933

ALLEGHENY FOREST EXPERIMENT STATION

General

The growing interest of our territory in the preservation of virgin timber areas for scientific study is evident from a meeting held in Washington between representatives of the Pennsylvania Forestry Association, the American Forestry Association, the Carnegie Institution, the Biological Survey, and the Forest Service. The President of the Pennsylvania Association, and practically the entire membership of a special committee appointed to consider means of preserving the virgin timber on East Tionesta Creek in the Allegheny National Forest, attended the meeting and spent an afternoon discussing ways and means. The Pennsylvania Association is interesting itself in the preservation of other areas in addition to the Tionesta tract. A promise was obtained from the Berwind-White Coal Mining Company that it will temporarily defer cutting operations in a lot of about 400 acres of virgin oak timber which it owns in Somerset County, Pennsylvania.

Management

Hough has progressed with the analysis of the cruise data obtained last summer at Kane. Black cherry is a promising species on which to base site determinations, because of its invariable dominance in the stands, and its wide distribution. At 40 years there appears to be a 30-foot range in height of this species, which we will attempt to correlate with physical differences in the sites.

Measurements

Schnur has completed the first draft of two articles on the loblolly pine data from the 1904 plots. He has worked chiefly on the oak yield study, however, and as a result of his studies of differences in the four species groups which he is recognizing he believes it will be feasible to build up what might be called synthetic stand tables for each one of these groups. Each stand table will of course be for a single age class and site.

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APPALACHIAN FOREST EXPERIMENT STATION

General

A platform was constructed atop one of the laboratories at Bent Creek on which to expose the rain gauge and anemometer for the headquarters weather station. This platform places the instruments above the influence of the trees which surround the buildings.

Barrett and MacKinney reported ice damage at points on the Blue Ridge near Neal's Gap in north Georgia. This damage was the result of the same storm that caused extensive breakage near Highlands, N.C., and in the Nantahala Mountains on December 17, 1932. At Dicks Gap, another point on the Blue Ridge in north Georgia, the Abells found no damage.

(Over)

Forest management - loblolly pine

The selective logging permanent sample plots at Franklin, Va., were burned over accidentally on March 13. Soon after receipt of the report MacKinney visited the plots and found that all six plots had been completely burned. Available information indicated that the litter was quite moist at the time of the fire and accordingly the damage to larger trees was not great. All loose surface litter, the grass, and most of the slash up to one inch in diameter was consumed, causing the death of all of the pine reproduction and most of the hardwood sprouts which came in following the cutting three years ago. Few of the loblolly pine trees left at the time of the cutting showed any appreciable crown injury attributable to the fire except where heavy brush piles were directly beneath them.

It was interesting to note that a living tree, heavily scarred at the base by previous fires, had caught fire on March 13 and had soon burned off. When the plots were visited on April 8 this tree, now prostrate, was still burning, approximately 22 feet of the bole having been consumed during the period.

Forest biology

Trapping of rodents was continued on an area cut during the winter of 1931-32 as a step in conversion to pine standards with hardwoods coppice. As during February the number caught was unusually large and seems to strengthen the assumption that slash offers favorable cover for rodents and for that reason may be detrimental to pine reproduction.

Forest fire weather

The first month of formal operation of the Fire Weather Service in District No. 8 was completed with the close of March, 1933. Observers in this district started reporting daily on March 1 and will continue through the spring fire season. Of the 12 fully-equipped stations, 10 reported continuously through the month with the exception of Sundays.

The data collected each morning at 8 a.m. included the state of weather, wind direction and velocity, temperature and humidity for 8 a.m., temperatures and humidities for 1 p.m., and 6 p.m. of the previous day, state of the fire hazard, and amount of precipitation during the last 24 hours. These data give a minute cross section of the weather over the district and provide information upon which to base a detailed forecast of conditions which are expected to prevail in the next 24 to 36 hours.

During this first month of operation 15 fire weather warnings were issued of conditions favorable for forest fires. These were grouped roughly over the periods March 1-7, 14-17, and 23-31. These forecasts or warnings were made as specific as possible and as was consistent with existing conditions. An effort was made to forecast the condition of the weather and sky, wind direction and velocity, minimum humidity for the day, important temperature changes, and the time of occurrence, intensity and nature of precipitation expected. In connection with the rain forecasts, an attempt was made to indicate the degree of certainty of the rain's occurrence by the

use of such qualifying terms as: "probability", "possibility", and "slight possibility". The purpose of this, of course, was to give those using the forecasts an idea as to the amount of dependence to place upon the occurrence of the rainfall. From the forecaster's point of view, the forecasts made to date have been satisfactorily verified in most cases.

The forecasts were issued at Weather Bureau expense to Forest Supervisors on the Cherokee, Nantahala, Pisgah and Unaka National Forests, the Smoky Mountains National Park office, and to District Foresters serving in western North Carolina, northwestern South Carolina, northern Georgia, and eastern Tennessee for distribution and use as they saw fit. In addition to this, they were broadcase over radio stations in Asheville, Knoxville, Chattanooga, and Nashville. The purpose of the radio broadcast was to effect a more complete distribution of the forecasts to those interested in and affected by them as well as serving to give listeners more of a forest fire consciousness in the hope of creating more favorable sentiment on the subject.

The monthly data from each of the stations have been summarized. It is interesting to note, though it agrees with expectations, that the average rainfall for the month for all stations was 3.41 inches, or over an inch greater than that for Asheville. The John Rock Station at Pisgah Forest recorded the greatest rainfall and Elizabethton, Tenn., the least. Temperatures at the most southerly stations averaged highest, while Damascus, Va., showed the lowest. The highest mean temperature was recorded at Point Lookout, but this is evidently due to the high minimum temperatures caused by air drainage on cold nights. No general conclusion can be drawn as yet concerning the variations of minimum humidities, though it appears that the lowest are to be found in regions of highest temperature.

Judging from the records of the Asheville station alone, March appears to have been deficient in precipitation to the extent of nearly two inches, while temperatures averaged 1-1/2 degrees above the normal. More significant figures for the fire weather stations can be given as the length of record increases.

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CALIFORNIA FOREST EXPERIMENT STATION

General

The Regional Investigative Committee meeting was held on March 7 and 8 in the Board Room of the State Harbor Commission at San Francisco. Some difficulties in preparation resulted from the absence of Regional Forester Show and Director Kotok in Washington until just before the meeting date. The reduction of meeting time from three days to two worked very successfully, however, by having project presentations confined to essentials necessary either for understanding of progress or for group advice desired.

Forest Management - Pine Region

A set of index curves for all-aged mixed stands has recently been completed and circulated for comment. The curves were developed in connection with analysis of the M-1 sample plot records. It is proposed that the use of the tallest 10 per cent of the dominants at maturity as a site index be abandoned, using instead the average dominant height at 300 years. Adherence to a uniform standard of reliability in determining the average is suggested.

In the younger age classes in selection stands the height growth of dominants is extremely variable, depending largely on the stocking of overwood under which reproduction started. Early growth in selection stands is usually less than in open grown even-aged stands of second growth so that use of a single set of curves for the two types of stands may lead to errors. There appears to be no significant difference in the height growth of ponderosa pine, sugar pine, Douglas fir and white fir when these species grow in mixtures.

Forest Management - Redwood

Person and Hallin continued the analysis of records from the survey of the redwood cutover areas. The study of stocking from natural seedlings and the type and density of vegetation shows some very consistent relationships. For the purpose of this study six vegetative types were used: hardwoods, woody shrubs, non-woody shrubs, tall herbs, low herbs, and grass. The natural seedlings were classified according to height and also as "redwood" and "all coniferous species".

The comparative stocking on the different vegetative types is shown in the following table, based on 6804 milacre quadrats studied in 1932.

Relation Between Stocking and Vegetative Types

	Stocking in Per cent						
	Woody shrubs	Non-woody shrubs	Tall herbs	Low herbs	Grass	Hard-wood	Average all types
Redwood seedlings	17.2	10.9	20.7	7.2	1.6	15.5	15.1
All coniferous seedlings	25.2	17.6	27.7	13.7	4.7	27.2	22.4
1/ Coniferous seedlings 6" AND UNDER in Ht.	10.4	6.9	23.9	5.2	1.9	13.5	13.3

1/ The quadrats stocked with the very young seedlings were classed separately as such seedlings would be affected most directly by the vegetation now present. The stocking on older plots was probably affected by an entirely different vegetative type or the same type with a different density.

It is noteworthy that the best stocking is found on plots on which the dominant vegetative type is tall herbs. This is particularly striking in the case of the seedlings under six inches where the present vegetative type would affect the establishment most directly. In the majority of cases where tall herbs were dominant the fire weeds (Epilobium angustifolium) and

(Erechtites spp.) were the dominant species. These are large annuals which would probably provide protection from sun and wind without excessive root competition.

The low herb and grass types, especially the latter, are associated with the poorest stocking. Whipplea modesta and Hypochoeris radicata are the most abundant low herbs, and Lolium temulentum, Asperis caryophylla, Notholcus lanatus, Festuca megalura and Dactylis glomerata are the most abundant of the grasses.

The density of the vegetation also shows a consistent relation to degree of stocking. In the following table the stocking under light, medium and heavy densities are compared for each vegetative group.

Relation of Density of the Different Vegetative Types
To Degree of Stocking from Coniferous
Seedlings 6" and Less in Height

Density	Stocking in per cent						
	Woody shrubs	Non-woody shrubs	Tall herbs	Low herbs	Grass	Hard-woods	Average all types
Light	21.1	7.4	24.0	5.6	2.0	16.0	16.1
Medium	5.9	6.8	21.0	2.1	0.0	10.0	7.8
Heavy	4.6	0.0	0.0	0.0	---	9.8	4.9

In every vegetative type the best stocking is associated with the light density. In the case of tall herbs, and to some extent non-woody shrubs, the stocking under medium density is almost as good. The average of all types shows a close inverse correlation of degree of stocking with density; with stocking decreasing in about the same ratio that density increases.

Range Research

Aided by the Sierra Forest, Renner supervised the construction of a 10-acre livestock exclosure and a rodent exclosure 50 x 60 feet in size on the Clark Administrative Site, Sierra Forest. The Clark area was selected as the location of these initial exclosures as being fairly representative of the woodland-Diggar pine portion of the foothill belt. Collection of vegetative data on sample areas inside and outside the exclosures has been started, to provide a basis for future comparison.

All of the 32 quadrats and 18 elevational stations were examined by Renner and Hormay working independently to record data from northerly and southerly localities during the same week. The addition of quadrats to this spring's scouting has enabled the Grazing group to obtain a more comprehensive picture of the growth and development of important forage species than was possible last year.

Unfavorable conditions of both rainfall and temperature have resulted in unsatisfactory forage conditions generally over the foothills. The average height of feed over the entire series of plots was not over 1-1/2 inches, in

late March. Various forage plants are starting to "head out" and flower at very diminutive heights.

Talbot and Renner examined a number of areas of public domain a few miles south of Mariposa. One area offered some work-center promise and will be investigated further with respect both to accuracy of status and to possibilities of cooperation from adjoining land owners.

Hormay finished the third and probably final set of complete notes on the seedlings in the greenhouse. Since only 12 species of herbs were studied in the greenhouse, no attempt was made to prepare a key for this group. For these plants, drawings and notes were made of each species at early vegetative stages, as an aid to their field recognition.

A tentative key was prepared for the 20 grasses selected for study. These species represent over 90% of the annual grasses occurring in the field where the range studies are in progress. With this key the six genera represented may be separated very readily; but differentiation within genera, especially Bromus and Festuca, was found more difficult and not all species have been separated. Further field checking of the key is deemed necessary, but it already has proved of material aid in the plot work.

Erosion - Streamflow

Lowdermilk spent the greater part of the month in southern California getting construction started on the check dams for the triplicate watershed installation. He was accompanied by Executive Assistant Conner to handle the considerable load of business administration anticipated. It was hoped to obtain the unskilled labor from the County, which volunteered to furnish it to us gratis, to be paid from the County's Reconstruction Finance Corporation unemployment loan. This proposal has developed the traditional difficulties attending the receipt of gifts. It may still be of use, however, pending the organization of the President's unemployment relief corps, the prospect of which has considerably changed the outlook.

There was a gratifying development in the securing of construction materials for the dams, engineered by Mr. Conner. The first set of bids received for these materials totalled approximately $4,000. These bids were all rejected and, before readvertising, all of the firms requested to bid were personally contacted, pointing out to them that this was an unemployment relief project and that any savings made on the cost of the materials would be used to extend the use of unemployed laborers. The second set of bids received totalled less than $2,500, making a net saving of approximately $1,500. Storage facilities have been constructed and three 2,000-gallon water tanks have been installed at each dam. The materials have now practically all been delivered to the dam site and everything is in readiness to start the actual construction of the dam as soon as the soil over-burden has been removed and the necessary construction labor recruited.

Fire Research

The natural target analysis has been continued to determine the general and specific effects on atmospheric visibility of distance, direction, time

of day, season, glare and shadow. This work will be done to develop relationships and then a correlation will be made between the natural targets and smokes. A large proportion of this analysis has been completed. Seasonal charts have been prepared which show the variations by time of day, days of the month and months of the year. In addition the cause of decreases in visibility can be determined by glancing at these charts. Analysis has been made and a graphic record of causes for impaired visibility by hours of the day prepared. This shows the proportion which each cause contributes to decreasing the ability of lookouts to adequately view their units. Shadow, drift smoke and haze are the chief offenders. Shadow, of course, shows its maximum effect in the late afternoon and an appreciable effect up to 9:30 to 10 o'clock in the morning. In general these three factors are approximately equal in occurrence and duration.

From the analysis several tentative classes of visibility have been set up and will be checked further. These classes of visibility are as follows:

Excellent	- allowing vision of small targets at distances over 17.5 miles.	
Good	- vision from	12.5 - 17.5 miles.
Medium	- " "	10 - 12.5 " .
Fair	- " "	7.5 - 10 " .
Poor	- " "	0 - 7.5 " .

A very small proportion of the days or hours of the 1932 season fell in the "Poor" class. The majority of the season except for a few days in September and October could be rated as "Excellent" and "Good".

Forest Products

Logging and Milling Studies

An article for the TIMBERMAN, announcing the publication of the Stanislaus study bulletin and summarizing a few of the results, was prepared by Brundage. The feature of the article is a full-page drawing giving a pictorial contrast between results from 50-inch, 20-inch and 16-inch sugar-pine trees. Using the 50-inch tree as a base, the comparison is followed in "Believe-It-or-Not" style, depicting the numbers of 20-inch and 16-inch trees which must be cut to produce the same volume as that obtained from one 50-inch tree. Beside the 16-inch tree are 34 stumps and in the foreground a pile of 102 small sawlogs. Beside the 20-inch tree appear 15 stumps and 60 sawlogs. Beside the 50-inch tree appear one stump and 9 sawlogs. Corresponding with the piles of logs are three lumber piles, side by side, each containing 4,950 board feet. Below the piles, parallel columns of figures show the cost per tree, cost per pile, cost per M.B.M., value per M.B.M., and finally the margins per M.B.M. It is hoped that this combination of figures with an illustrated showing of the radical differences in the numbers of pieces of raw material which have to be handled to produce equal quantities of lumber will be more convincing to lumbermen readers than the usual tables and curves as a method of "getting across" the reasons why low costs per tree in the small sizes become high costs per M.B.M.

Work on the compilations of time-study and other data for the final report, to be published as a manual of basic information for appraising size-margin relations on other operations cutting similar timber, at any given wage-scales and selling prices, has gone forward with considerable revamping of computing technique. One interesting phase of the reanalysis of limbing time per tree showed that time "waiting for fallers" can not properly be prorated to diameter and species as other delays are prorated. With sugar pine, white fir, and incense cedar, the limber completed his job well ahead of the falling time on all sizes, but with ponderosa pine he lagged behind on sizes above 24 inches d.b.h. It took the limber 21.7 minutes longer to limb the average ponderosa pine than it took the fallers to cut it down. On the other hand, the limber had 25.6 minutes for loafing on the average sugar pine, 13.7 minutes on the average white fir and 16.7 minutes on the average incense cedar tree. It is evident, then, that part of the loafing surplus on three of the species, considered by themselves, was used for catching up with the fallers where ponderosa pine is concerned when the four species occur in mixture. The allocation of this item is one of those steps in logging-study computational procedure which appears simple at first but which takes on the aspect of a Chinese puzzle as one proceeds to put the parts together.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

Auten has been appointed to the Committee of Organic and Forest Soils of the American Soil Survey Association.

M-2 Farm Woodland Management

The permanent sample plots which have been established in connection with the woodland grazing project during the last two years have been selected with the ultimate purpose of using them eventually for a comprehensive study of farm woodland management. The grazing study has now reached the stage where the field work consists largely of plot remeasurement. Accordingly, plans are now under way to increase the emphasis on the farm woodland management phase.

M-3 Chestnut Oak Regeneration

The findings of four years' observations in the establishment and growth of chestnut oak seedlings on 160 Ohio and Indiana quadrats have been tabulated and summarized by Kuenzel during the past month. It is expected that a report of these findings will be desirable after the 1933 observations are completed.

Fp-1 Black Locust Volume Tables

With the aid of the statistician, the checking of field data has been resumed at the point where the work was interrupted last August. Kellogg has been curving the individual tree measurements preparatory to planimetering them.

M-1 Forest Sites

Analysis of black walnut site data was continued during March by Auten and Kuenzel. Some difficulty was experienced in choosing a suitable index for expressing the productivity of a plantation. Site index, mean annual growth per acre, and average height were plotted against various soil characteristics. On the black prairie soils of Illinois mean annual growth of planted black walnut stands was influenced to a marked degree by the per cent of colloids in the B horizon. This condition was found to give a marked correlation for all age classes. The tight, waxy soil profile associated with a high per cent of colloids hindered normal penetration of surface roots.

Work of Former Field Assistants

Dr. A. G. Chapman, of the Ohio State University Department of Botany, has completed his manuscript on the effect of black locust on the growth of associated species. Chapman collected much of his field data in cooperation with the Station, while serving as crew leader in the forest plantation studies.

Johnston C. Craig, who served as field assistant with the 1932 locust plantation study crew, has recently been appointed forester of the Power & Light Company of Springfield, Illinois. This company holds over 8,000 acres, half of which is now or will be a reservoir site. The land area is to be planted, at the rate of 100 acres per year, beginning in 1934. Some planting will be started in 1933. A tract of 1,000 acres of forest land is to be reserved as a forest and game reserve. Considerable recreational development of the area is also planned for.

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NORTHEASTERN FOREST EXPERIMENT STATION

Since the station will complete ten years of existence on the first of July this year, an attempt has been made to compile a condensed record of the history of the station.

Considerable time has been devoted to plans and activities in connection with the administration program for unemployment relief. A paper prepared by Jensen for the Northeastern Forest Research Council, which gives specific examples of the results which might be expected from cultural operations which may be undertaken for unemployment relief, was mimeographed and distributed to a selected list of those who might be able to use it in developing plans for constructive work. Brief statements were also prepared by other members of the staff, indicating in a crude way the total amount of work which might be provided in the region in the girdling of worthless hardwoods to release pulpwood species, in cultural treatment of young stands of white pine, and in the construction of fire lines for the protection of areas of extreme hazard such as the pine plains characteristic of a number of localities in the region.

Based upon meteorological data obtained at forest fire-weather stations, Stickel has prepared a brief report of the effect of forest cover upon water loss in the Northeast. The four factors discussed are evaporation, precipitation interception, and duff and soil temperatures. In general, the average evaporation during the growing season in the open is about 1.8 times as great as within the forest except in Northern Maine where the ratio was about 1.3. The greatest difference between open and forest evaporation usually occurs during August. The average seasonal precipitation interception was found to range from 26.1 to 40.6 per cent in coniferous stands. In a heavily culled northern hardwood-softwood stand it was considerably less. The greatest percentage intercepted was in a young mature balsam fir, red and white spruce stand. The effect of the forest upon reducing duff and soil moisture loss by reducing duff and soil temperatures is particularly striking. Differences of 70° F. between open and forest surface duff temperatures and 25° between open and forest top soil temperatures are by no means uncommon. Likewise, it is not out of the ordinary to find that within 24 hours after rain a differential of 58° may take place between 8 and 11 a.m. in the open surface duff temperature, while within the forest for this same period the rise in surface duff temperature may be less than 5°.

From the tabulation of phenological reports for 1932, it appears that we now have 21 cooperators with definite offers of assistance from a number of other points for this year. The 1932 reports indicated a good seed year for white pine throughout the Northeast. It seems, however, that in central Maine the cones of both white pine and red spruce, of which there was also a good crop, were seriously infested with insects.

Doctor Stewart and Morey have been engaged in analyzing the data obtained from the plantation survey of the past two years as the basis for a progress report. A rough classification of 211 white pine plantations examined would place about 60 per cent in the medium site class with the balance about equally divided between good and poor.

Practically all the data gathered in the survey of experimental forests have now been summarized and compiled for the permanent records. Calculation of volume in the hardwoods of small sizes, however, is being held up, pending the completion of the volume tables which Reineke is now compiling.

MacAloney has prepared plans for a special study of the rate of distribution of the European pine shoot moth which he hopes to conduct this spring.

Miller has been busy preparing the final report on his study on the effects of birds on the population of the white pine weevil. He has also given considerable thought to the preparation of plans for studies of game management in relation to forestry on an experimental area which may be selected this spring. It is possible that the Bartlett Experimental Forest in the White Mountains may be suitable for his work.

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NORTHERN ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Early in March Gisborne spent a week at the Madison Laboratory working with M. E. Dunlap on the preliminary design of an instrument to provide a continuous record of (1) duff moisture, (2) wood moisture, and (3) wind velocity on one chart. With such an instrument, and with a standard hygrothermograph and rain gauge, it is expected that much needed studies can be made of all these factors of fire danger according to slope, exposure, and elevation. Decided differences in fire danger are known to exist under these different conditions even though the timber and fuel types are alike and these differences affect the speed and strength of attack needed for successful forest protection. Until these differences are measured it will be impossible to provide the proper speed and strength of attack except on the basis of judgment. This new instrument also is needed at many forest inflammability stations where the guard or ranger is often compelled to be absent for several days fighting fires, and the fuel and weather records essential for checking fire control action on that fire are thereby lost. The Regional Office has expressed the opinion that provisions are urgently needed to meet this situation.

At the recent meeting of the Western Forestry and Conservation Association in Seattle, Gowan, McArdle, and Gisborne were able to hold their first discussion of mutual problems. These three men also met with the eight Weather Bureau officials attending this meeting and at the request of Major Bowie the opinions and desires of the Forest Service for better fire-weather forecasts were brought up for discussion. A spirit of friendly frankness and real cooperation was clearly evident.

Because of the marked expansion of use of the wood cylinder method of measuring forest inflammability, Gisborne has prepared a description of this method for publication in the Journal of Forestry. A tabulation showing the probability of occurrence of all lightning storms, and of dangerous storms, by 10-day periods for each of the fire Forests has been completed ready for distribution. A description of a new method of localizing the forecast of lightning storms on the basis of high and low elevation minimum temperatures also is ready for release in April.

Logging and Milling

To date the section of Products has completed selective logging studies on four separate ponderosa pine operations. It is felt that the results of these combined studies should be applicable to the average of the ponderosa pine type throughout western Montana. In the near future it is planned to place these data on punch cards and analyze them from a Regional standpoint. The results of this work would be presented in a mimeographed report, or possibly a Departmental bulletin.

One of the objectives of our recent A.C.M. selective logging study was a determination of our ability to segregate ponderosa pine logs according to their conversion value for lumber. Four log segregations were used:

Grade 1. Select type.
" 2. Shop type.
" 3. Good common type.
" 4. Poor common type.

Approximately one-half of the logs were graded in the standing tree and the remainder on the landing in the woods.

The following tabulation shows the results of this grading:

Grade	Overrun %	Selling value lumber tally	Selling value log scale
1	12	$ 27.94	$ 31.31
2	22	18.31	22.32
3	22	22.48	27.41
4	32	16.08	21.21

Based on lumber tally values, the spread between the best (grade 1) and the poorest group (grade 4) of logs was $11.86, or 74%. On a log scale basis this same spread amounted to $10.10, or 48%. These results seem very satisfactory and quite close to the optimum that could be expected. On a previous study logs were segregated according to theoretical log grades, i.e., logs were allocated to the grade on the basis of the actual amount of lumber produced. In this case the spread in value, lumber tally, between the best and poorest logs was 84%, or 10% over what was obtained in the present study.

Lumber Production Costs in the Inland Empire Region

Regional Logging Engineer Philip Neff and M. Bradner obtained lumber manufacturing and logging costs from 17 of the band sawmills in the Inland Empire. The amount of lumber produced by the larger band mills in the Region was much less than in 1931. The 17 identical mills cut 302,681 M feet in 1932, as against 528,928 M feet in 1931. The percentage of Idaho white pine lumber cut, however, increased from 58 to 68 per cent. Shipments for 1932 were approximately 60 million feet more than the cut, so that the stocks on hand have been reduced materially. Orders have increased substantially during the last few weeks, and although the increase may be largely seasonal, the lumbermen are hopeful that this is not entirely the case. There has been a slight advance in the selling price of ponderosa pine lumber.

The cost of manufacturing lumber in the band sawmills was about the same in 1932 as in 1931. The direct costs, because of lower wages, were somewhat less in 1932. Overhead charges have increased, due to the much curtailed production and sales. Below is a tabulation comparing the manufacturing cost per M at ten identical Idaho white pine mills for 1931 and 1932.

Ten Identical Idaho White Pine Mills

Year	Total cut M all species	% I.W. pine	Manufacturing cost per M ($) Pond to pile	Dry kiln	Pile to car	Overhead	Total
1931	318,385	82	$ 2.83	$ 0.96	$ 5.05	$ 3.96	$ 12.85
1932	209,905	92	2.51	0.56	5.00	4.38	12.45

In 1923 the cost of manufacture in the Idaho white pine mills was $12.63, as compared to $12.45 in 1932. The wholesale mill run selling value of Idaho white pine lumber was $48.85 per M in 1923, however, as compared with $22.87 in 1932. The 1932 average selling price of Idaho white pine lumber is $5.85 higher than that of ponderosa pine, its closest competitor. It is for this reason that the percentage of white pine in the total amount of lumber cut continually increases. The 17 identical Idaho white pine mills produced 92% white pine lumber in 1932, as compared with 82% in 1931.

The manufacturing cost in the ponderosa pine is slightly higher in 1932 than in 1931. Below is a tabulation showing the comparative costs in five identical mills.

Five Identical Ponderosa Pine Mills

Year	Cut of M All species	Manufacturing Cost per M ($) Pond to pile	Dry kiln	Pile to car	Overhead	Total
1931	117,600	$ 3.21	$ 0.25	$ 4.32	$ 3.57	$ 11.35
1932	68,625	3.32	0.15	4.38	3.87	11.72

The 1932 logging costs have in a majority of cases been reduced. The following tabulation gives a comparison of the logging cost per M for identical mills for 1931 and 1932.

Company No.	Logging Cost Per M ($) 1931	1932
	Idaho White Pine Logging.	
1	$ 20.50	$ 17.05
2	19.13	16.09
3	16.07	14.15
4	14.75	10.72
5	13.25	14.94
6	12.85	13.08
7	9.71	10.84
	Ponderosa Pine Logging.	
1	12.46	12.52
2	8.73	6.36

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

March has been a time for meetings of one kind or another. The sessions of the Investigative Committee occupied all of March 8 and 9 and half of March 10. The majority of the Station staff was present as well as a dozen or so from the Regional Office. Paper work prior to the meeting was reduced to a minimum, but that did not seem to detract from the vigor and value of the discussion; the meeting was considered the most worth while that has been held for some time.

The Western Pine Association held its annual meeting in Portland, and Lodewick attended most of the sessions and Munger some of them.

The Western Forestry and Conservation Association held its annual meeting in Seattle. After the meeting, Directors Munger, Watts, and Forsling joined Director Rockie and Mr. McGraw of the Erosion Experiment Station in central Washington, and inspected a considerable area which is a pitiful example of an attempt to farm submarginal land with its attendant physical, economic and social evil consequences. In this case wind erosion has wrecked the attempts at farming this very dry land. Director Rockie had particularly sought Mr. Forsling's advice as to what was taking place here and what should be done about it.

Forest Survey

Douglas fir region - During the month the finished type map and statistics for the Columbia National Forest were turned in by Bright. The only forests in the Douglas fir region yet to be completed are the Olympic and the Siuslaw. Logan will probably finish his computations on the former by the end of April.

For all the forests which have been done in western Oregon and Washington, there has been to date only one colored type map at a scale of 1 inch to the mile prepared for each forest. A procedure allows, by a process of masking out certain areas on the negatives, the production of type maps for any desired unit, such as a working circle or a ranger district. This procedure was described at the annual Investigative Committee meeting held in March, and Regional Forester Buck appointed a committee from the Regional Office to look into it when the Olympic samples were available in order to see if it could not be extended to all the other forests.

The Survey staff has been busy at the computation and recapitulation of type data and volume data for areas outside the national forest boundaries. This is merely a continuation of the procedure in effect during the last two or three months. The item of finding out exactly the number of acres in the various survey townships as shown on the Land Office plats has been more of a problem than was first anticipated. There are a good many townships where as many as three or four plats have to be assembled before all the official areas in a township as shown by the General Land Office are available. Apparently there is no particular agency which has ever kept a record of the

assembly of all these data for the areas outside the boundaries of the national forests, although a somewhat similar job must have been done at some time by the Census Bureau. It is not at all unusual to find that the total area of the township as shown on the plat does not correspond with the figure found by adding up the section by section values. The survey staff assumes that the section by section total is a better figure than the total figure shown on the bottom of the plat.

The State Land Office at Olympia sent in an order for the survey to make copies of all the generalized type maps for western Washington, the State Land Office to pay the cost of such drafting.

Ponderosa pine region - A Survey staff discussed the matter of scale of field maps for use in the "ponderosa pine region" of Oregon and Washington. It was the consensus of opinion that field work in this region could best be done by using a 2-inch-to-the-mile field sheet, and that the data thus gathered will be currently transferred to a 1-inch-to-the-mile map by the field man. It was suggested that the best procedure might be to have photographic copies of the original G.L.O. township plats made, and that field mapping be done on these, but that for the purpose of final maps and for filing of results these data be transferred to transparent overlays which would fit 1-inch-to-the-mile enlargements of the national forest base maps. A record in map form of the areas which have been either intensively cruised for management purposes or examined for land exchanges in eastern Oregon and Washington is being prepared.

Late in March, Putnam, who tried out forest survey procedure in the Wenatchee Forest last summer, was called into Portland for a conference with Dutton of the Office of Grazing and members of the survey staff. Putnam had been asked to see what additional time it would take to get data on grazing along with data on timber types and volumes. He reported (1) that in the work done to date in the "low" country, no additional travel was required to secure grazing types and no additional time was spent other than that required for indicating the grazing type boundaries on the map, and (2) no work was done in the "high" country and therefore no record secured as to additional time necessary to extend grazing types into alpine or nontimbered areas not ordinarily covered by the survey. The Office of Grazing feels that the grazing typing done by Putnam last season is a substantial improvement over the old range appraisal typing on record for the same locality, and feels that similar improvements could be made in many of the old type maps for areas in pine which may be covered by the survey.

New Public Domain

During the month of March Mr. Wilson made the following addresses: March 2 before Kiwanis Club at Oregon City, Oregon, topic "Waste, Shrinkage and Proper Land Utilization"; March 7 before Snohomish County Chamber of Commerce at Monroe, Washington, topic "Land Abandonment"; March 23 before the Agricultural Committee, Pacific Northwest Advisory Board of American Railway Association at Seattle, Washington, topic "Some Problems Confronting a Land Utilization Program for the Pacific Northwest"; March 23 before the Western Forestry and Conservation Association at Seattle, Washington, topic

"Trends in Tax Delinquency". Conferences relating to logged-over land use problems were held with Snohomish County Agricultural Agent and a few representatives at Everett, Washington on March 7, and with Kitsap County Agricultural Agent, Assessor, Treasurer, Chairman of Board of Commissioners and other employees of the county at Port Orchard, Washington on March 8. Audited certain Washington State Land Office records at Olympia and ran down large errors in their computations which seriously affected new public domain and forest survey computations. Conferences held with Professor Jeffers, School of Forestry, University of Washington on cooperative studies in Mason County. The remaining time was spent in office routine.

Forest Insurance

Douglas Fir Region - A considerable portion of March was devoted to the completion of the causative hazard study of the Douglas fir region. It had never been possible to complete this phase before because of lack of information from the forest survey. By the beginning of March, however, the survey work had progressed to the point where it was possible for the insurance study to get all the information required so this job was pushed through.

This means that this phase of the study of the Douglas fir region is now fully completed with figures ready to enter into the final rating schedule. These figures are measures of the hazard of the inception of fire at given points as they are exposed to classified causes of fire. They indicate that, on a "weighted by area" basis logging is by far the most serious cause of fire in the region.

Ponderosa Pine region - The causative hazard study of the ponderosa pine region was completed, up to date; some additional work may possibly be done on this phase in California. A considerable amount of time has also been spent on the climatic phase of the study of the ponderosa pine region. This has been brought forward as far as possible until data are obtained from Idaho and California.

A conference was had with MacDaniels on the question of the grading of protection in the pine region. It appears that the final completion of this phase will not require a great amount of time.

Mensuration

The new volume tables for western hemlock, for which the initial computations were started in February, are now practically completed and ready for the detailed calculations involved in the yield study of even-aged and uneven-aged stands of western hemlock and Sitka spruce which will be started shortly. Volume data on second growth spruce is almost entirely lacking for this region, and one of the first tasks will be to collect suitable information of this sort. Meyer began a review of all pertinent literature on the growth of these species.

Plans were reviewed with the Regional Office for starting a large scale thinning operation in stagnated reproduction in selectively cut stands of ponderosa pine on the Whitman National Forest. Although a certain area may

be understocked on the whole, nevertheless the reproduction occurs in dense clumps and thickets, so that much of it soon becomes stagnated. By liberating a portion of the stand or by freeing a certain number of "crop" trees per acre this condition will be partly cured and enough trees will develop at the normal rate to furnish future cuts. Hand thinning and thinning by power, such as with a caterpillar equipped with a bull-dozer, were discussed.

Section of Products

Bradner, Chief of Products at the Northern Rocky Mountain Station, spent a few hours at the station while in town to attend the Western Pine Association annual meeting.

Lodewick presented a portion of the results of the Requirements phase of the forest survey in a talk before the March meeting of the North Pacific Section of the S.A.F. The methodology and some of the outstanding trends were discussed under the title "Predicting Lumber Requirements for Portland Dwellings".

Computations on the two Douglas fir mill scale studies have progressed rapidly and should be completed next month.

Lumber, Lath and Shingle Census - During the month 872 third requests were sent out. To date 1006 acceptable schedules have been forwarded to Washington, of these 763 were forwarded during the month.

Minor Species - The office report "Oregon White Oak: Its Properties and Uses" has been completed. A short digest of the report was prepared for submission to a local trade journal for publication.

Section of Silviculture

Ponderosa Pine Silviculture - An analysis is being made to determine the probable financial returns resulting over a period of years from various methods and degrees of selective cutting in ponderosa pine stands. For this purpose Kolbe is using detailed maps showing for 40-acre plots the location of all trees, their crown classes, etc. The results of Meyer's growth study in ponderosa pine and the mill scale studies made by Products are providing extremely valuable basic information for this analysis. By "logging" each plot in several different ways and projecting the growth of the reserve stand into the future, it should be possible to estimate rather closely the financial returns possible from each method of cutting.

Fire Studies - Matthews prepared summaries of fire depletion for one release unit and partially completed summaries for another unit. Preparations were made for the fuel inflammability study to be conducted during the coming season on all forests of the region.

Nomenclature - We read with considerable interest at this station the Report of Conifer Conference, which was held in London some 18 months ago, as it contained an account of nomenclature changes that have been made in Europe. We are gratified to know that Europeans now call our Douglas fir, P.taxifolia, western hemlock, T. heterophylla, and western red cedar, Thuja plicata. We are rather perturbed, however, at having our lodgepole pine called P. contorta, var. latifolia and at the use by the Service of the name Sequoia washingtoniana when all the rest of the world including botanists in this country call it S. gigantea.

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SOUTHERN FOREST EXPERIMENT STATION

Management

At Urania, Louisiana, Bull and Bickford worked on the new methods of thinning by use of "checkerboard" plots in 20 to 30 year old loblolly intermixed with large hardwoods and pine seed trees. Forty-eight plots, each 1/4 acre in size, were selected for this study. These were divided into two groups, 24 to be thinned, 24 to remain untreated. Care was taken to insure that the original stands in both groups were comparable. Each group consisted of alternate plots throughout the extent of the solid block, thus giving a checkerboard effect for the thinned and unthinned plots. The selection of treated and untreated groups was entirely mechanical; the series (A or B) to be thinned were chosen by tossing a coin.

Forestation

Remeasurements made on the 1924-25 longleaf plantations at Bogalusa, now eight years in the field, indicate remarkable growth; a few of the trees have attained a height of 19 feet.

Protection - Fire

The working plan for the longleaf pine controlled burning experiment on the Olustee Experimental Forest was completed and approved. The first burn was made on March 9th. Excessive scorching (about 90 per cent) of the crowns of longleaf occurred in spite of the care in choosing favorable weather for burning. The results of this first burn point toward the possibility of burning at night or during moist weather in order to lessen the damage to the pines on areas of such high accumulation (three years in present instance of inflammable "rough".

Naval Stores

Sixty-six trees were selected for a study of longleaf pine defoliation by fire and its effect on gum yield. The needles were removed by scorching which was done by means of torches mounted on short lengths of bamboo poles and operated by a man in the tree. Three degrees of crown scorching

are being studied; namely, 1/3, 2/3, and full defoliation. Gum yield from the first day after chipping is being measured each week from these trees and after the variation for temperature is taken out the residual curves of yield over time will be compared for the different degrees of burning.

Red Gum Growth and Yield

The field crew spent most of the month scouting for plot material in northern Florida, southern Alabama, and southern Georgia. Many areas of old field red gum were found on the Apalachicola River in Florida and on the Altamaha River and Oconee River in Georgia. These stands were mostly over 50 years old, but some cutting has been made in nearly all of them. One company in Florida was visited where cutting on a selection basis had been going on for the last ten years in an old field stand of red gum.

Financial Aspects of Private Forestry

The Station began active work on a land use project in the Piedmont section of Georgia early in the month. The Division of Land Economics of the Bureau of Agricultural Economics, U.S. Department of Agriculture, has charge of the project as a whole, while the Southern Station is cooperating to the extent of obtaining and working up data on the forestry phases. The Georgia Forest Service, the Georgia Experiment Station, and Georgia College of Agriculture are also cooperating. The forestry phase of the study will consist of plane table mapping of forest areas and a study of the condition of stands, increment and financial possibility of growing timber on seven scattered areas across the Lower Piedmont Region of Georgia. Each area will comprise about 15 square miles and will represent one distinct soil condition. In addition, a narrow strip about 200 miles long will be run across the State to amplify results obtained on the areas studied intensively. It is estimated that the field work will be completed by June 1st.

Work on the report on the financial aspects of timber growing in Union Parish, Louisiana, was continued. This report may be published in bulletin form by the Louisiana Agricultural Experiment Station.

Erosion

Meginnis with the help of local labor prepared five gullied areas for erosion control plantings. One of these areas was a large wash bordering a highway, and will furnish an excellent opportunity to apply a few vegetative control measures to an eroding roadside, a type of work badly needed in the South. This year the new areas have received more thorough preparation than in the past. All the areas were plowed and 36 soil saving dams constructed. Six grades of 1-0 black locust are being used as well as 1-0 seedlings of black walnut, white ash, and slash pine. Owing to the scarcity of desirable nursery stock, wild seedlings of sassafras, persimmon and red cedar were dug locally. Root and stem cuttings of black locust, mimosa, honey locust, cottonwood, and willow were also collected and used.

New Public Domain

Field work in the New Public Domain project was resumed the 13th of March. Johnson County, Arkansas, was chosen as the next county to be intensively studied. The Arkansas Agricultural Experiment Station is furnishing two men to assist in the work.

An analysis of the tax books of Johnson County reveals the following data, as of date:

Area certified to State, and now in State title	29,382 acres
Delinquent for 1930 taxes	24,026 "
Delinquent for 1931 taxes	40,441 "
Total involved in delinquency	93,849 "
Federal lands:	
Ozark National Forest (revenue producing)	12,627 "
Unappropriated public domain	760 "
Total federal	13,387 "
Total non-taxpaying	107,236 "
Total non-revenue producing	94,602 "

The last figure (94,602 acres) represents 21.9 per cent of the gross land area of the county.

On March 28th, Craig addressed the Clarksville Lions Club on his work and on conditions in Johnson County. He also prepared a paper on "The Problem of Tax-Delinquency in Land Economics", to be delivered at the Annual Meeting of the Arkansas Academy of Sciences at Little Rock, April 14-15.

Forest Survey

General - During the month Director C. H. Granger, and J. W. Girard, Logging Engineer for the Survey, were in New Orleans. Director Granger was in the office several days discussing matters of policy and procedure with th Survey staff. Girard, in addition to discussing problems in the office, spent several days in the field checking the work of the Survey parties, testing the application of volume tables, and outlining numerous proposed changes in both field and office procedure.

Upland Hardwoods - Owing to the small size of the Upland Hardwood Unit of Mississippi, combined with the high percentage of non-forest land, the systematic sampling of the forest area proved inadequate to give reliable data for the 2,176,000 acres (466,000 acres of forest land) in the unit. It was, therefore, decided to combine the data collected in this unit with those taken in the shortleaf-hardwood region in the northern portion of the State. The area of this combined unit, between 8 and 10 million acres, shou furnish reliable data for areas and volumes.

In order to test out the applicability of the "Crop Meter" for use on the Forest Survey, over a thousand miles of road were covered in northern and eastern Mississippi and records made of forest cover and condition. Twelve land classes and forest conditions were tallied on the key board whose

indicator records in terms of 100 feet of linear distance. The tally was made on the right-hand side of the road, and well beyond the right of way. On an area of over 2 million acres, the crop meter figures checked the Survey data for percentage of total area in forest by .8 of 1 per cent. The figures on cut-over and second-growth, however, failed to check very closely. This was partly due, no doubt, to the difference in tallymen and also to the fact that condition as a result of cutting may be closely correlated with nearness to highways. It is felt that the crop meter can be used for very extensive reconnaissance in advance of work in a given region. By combining the use of the crop meter with a system of "logging" the various roads traveled, a valuable record of forest information, occurrence of mills, etc., can be obtained.

Pine - Eldredge, Girard, and Lentz spent several days with each of the field crews checking plots already tallied. This checking showed that the field parties were doing very careful and consistent work. As a result of three days checking with each crew, the check tally on number of trees differed only by a tree or two. In checking log grades and merchantable lengths, Girard found the estimates to be conservative. A direct result of this field checking was a recommendation for simplifying the field procedure and clarifying the field instructions.

Tree measurements taken during the field trip, combined with numerous ones taken by the field parties, provided a sufficient number of trees to check the Survey volume tables for hardwoods and to enable Girard to construct tables for shortleaf and loblolly pine.

Through hiring four temporary field assistants, the crews have been increased to three crews of three men each. In case additional men are obtained at a later date, these new men will be available for crew leaders.

Pathology

Siggers spent the entire month analyzing data for a report based on surveys throughout the longleaf region to determine the relation of needle blight of longleaf seedlings to the time elapsing since a given fire.

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REGION 2

The Regional Investigative Committee met in Denver on March 1 and 2. Once again a very successful meeting was held. The attendance was considerably larger than that of any previous meeting, this being due to the keen interest shown by the schools within the Region, as was indicated by the large number of staff members who participated in the deliberations of the committee. Some delay has been experienced in getting out the final report, but it is expected that it will be ready for submission at an early date.

Upon completion of the investigative committee meeting, the camera point committee, including two members of the Regional office, one from the Experiment Station, and three Supervisors, convened and passed upon the recommendations of the various Forests with regard to the establishment of permanent camera points.

Management Studies:

During the first half of the month, Lepley and Williams continued to compile sample plot data for cut-over plots within the Fremont Experimental Forest. When the data for these plots are compiled, there will be available for the experimental forest a nearly complete record for all of the plots upon which an original measurement and a remeasurement were made.

Additional data relating to the status of "pitch girdle" infection in the sapling Douglas fir stands on the Pike Forest were tabulated from the field notes by Roeser, but the work was not completed prior to his visit to the Regional office during the week of March 12. The purpose of this visit was two-fold. The several manuscripts dealing with growth on sample plot areas within the spruce type were reviewed in order to present them in final report form; the summarized data resulting from the numerous strip survey accretion boring studies in the Engelmann spruce type were reviewed with their compiler, Supervisor Pearce, yield curves and tables applicable to individual Forests and to the Region as a whole were prepared, and an outline for the final report on the project, upon which Supervisor Pearce commenced work immediately, was drawn up.

Type Study:

During his relief assignment at the Fremont Field Station, Lepley started to transcribe the soil temperature data obtained in observations at the various local field stations from the field sheets to the permanent office records. The 1930 record was thus disposed of prior to the end of the month. During April, this work will be brought to date for the soil temperature phase of the type study.

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MANUSCRIPTS

Northeastern

Abstract by H. F. Morey of "Studies on Tree Roots," by E. V. Laing. (For Jour. For.)

Translation by P. W. Stickel of "The Disease of Slavonian Oaks," by P. Georgevitch (For Jour. For.)

Northern Rocky Mountain

Lightning and Forest Fires, by H. T. Gisborne (For Pulp and Paper).

The Wood Cylinder Method of Measuring Forest Inflammability, by H. T. Gisborne (For Jour. For.)

Southern

Tree Planting to Reclaim Gullied Lands in the South, by H. G. Meginnis. (For Jour. For.)

Southwestern

Does it Pay to Reserve Thrifty Mature Trees of Ponderosa Pine for Future Cutting, by Herman Krauch. (For Jour. For.)

Pacific Northwest

"Prediction of Lumber Requirements in the Pacific Northwest: III, Urban Repairs and Alterations." J. Elton Lodewick. Office Report.

"Oregon White Oak: Its Properties and Uses." Herman M. Johnson. Office Report.

"Oregon White Oak: Its Properties and Uses." Herman M. Johnson. 12 pp. for publication in trade journals.

"Fire Research in Progress at the Pacific Northwest Forest Experiment Station." R. E. McArdle. Address at Western Forestry and Conservation Association in Seattle.

"Ecological Aspects of Douglas Fir and Natural Regeneration in the Pacific Northwest." R. E. McArdle and L. A. Isaac. Paper for the Fifth Pacific Science Congress in Victoria, May, 1933.

"Practical Application of Silviculture to Overmature Stands now Existing on the Pacific." Thornton T. Munger. Paper for the Fifth Pacific Science Congress in Victoria, May, 1933.

"Waste, Shrinkage and Proper Land Utilization." Sinclair A. Wilson. Address before Kiwanis Club at Oregon City, March 2.

"Land Abandonment." Sinclair A. Wilson. Address before Snohomish County Chamber of Commerce, March 7.

"Some Problems Confronting a Land Utilization Program for the Pacific Northwest." Sinclair A. Wilson. Talk before Agriculturel Committee at Seattle, March 23.

"Trends in Tax Delinquency." Sinclair A. Wilson. Talk before Western Forestry and Conservation Association at Seattle, March 23.

"Land Utilization." H. J. Andrews. Talk before Kiwanis Club at Shelton and Snohomish County Chamber of Commerce at Everett.

"Predicting Lumber Requirements for Portland Dwellings." J. Elton Lodewick. Talk before S.A.F.

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Day, Ralph K., and Daniel DenUyl	The Natural Regeneration of Farm Woods Following the Exclusion of Livestock. (Bul. 368, Purdue Univ. Agr. Expt. Station.)
Eyre, F. H.	Possibilities of Release Cuttings in Minnesota Forests. (Jour. For., April, 1933.)
Meyer, Walter H.	Approach of Abnormally Stocked Forest Stands of Douglas Fir to Normal Condition. (Jour. For., April, 1933.)
Rudolf, P. O., and S. R. Gevorkiantz	After Planting - What? (Jour. For., April, 1933.)
Stewart, Guy R.	Forest Plantations Injured by Roosting Birds. (Jour. For., April, 1933.)
Whitfield, C. J.	A Method for the Removal of Plants and Soils in an Undisturbed Condition. (Jour. For., April, 1933.)
Winters, Robert K.	The use of fixed top diameters in volume Table Construction for Bottomland Hardwoods. (Jour. For., April, 1933.)

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